

## Results of Competition: SBRI: Innovation in Railway Platform End and Edge Technology

Competition Code: 1912\_SBRI\_NR\_MMM\_EDGE1

Total available funding is £1.08m plus VAT (£1.296m)

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

| Participant organisation names | Project title  | Proposed project costs | Proposed project grant |
|--------------------------------|--|------------------------|------------------------|
| Sensing Feeling Limited        | Station Trespass Reduction System<br>(Station TREDS) | £424,270               | £424,270               |

Note: you can see all Innovate UK-funded projects here: <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Project description - provided by applicants

Station Trespass Reduction System (Station TREDS)

The Station TREDS product will provide a scalable and cost-efficient, real-time station trespass deterrence, detection, alerting, data collection and reporting solution for use across the rail network, enabling station asset owners and operators to respond more proactively to trespass-related risks, incidents and events in real time through automatic visual sensing and alerting integrated with station command & control practices and station asset management systems.

Sensing Feeling delivers advanced human behaviour IoT sensing products powered by Computer Vision and Machine Learning. The company's products incorporate patent-pending sensing capability that performs automatic visual observation and analysis of human physical behaviours that can be used to reliably predict, deter and detect high-risk situations relating to individuals or groups of people in real world conditions within safety-critical environments, entirely passively, in real-time, and at scale.

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| Aralia Systems Limited         | Detection and deterrence of trespass with advanced AI controller | £425,786               | £425,786               |

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Project description - provided by applicants

Edge based trespass detection software for the detection of individuals trespassing, fare evasion and causing criminal damage; such as graffiti. Deterrence through responses tailored to the individual and the nature of the trespass. The solution reduces false positives through the use of convolutional neural nets for object classification and scene context to determine behaviour. The solution is low cost, can accept a wide range of sensors and is capable of operating at sites without mains power or WiFi.

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| Zircon Software Limited        | Trespasser Identification and Deterrent System (TIDS) | £432,000               | £432,000               |

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## Project description - provided by applicants

Zircon software has a wealth of experience in developing high-integrity safety related applications within the rail industry. Our understanding of assisting clients throughout each individual RIRL's up to product deployment for well-known organisations such as Knorr-Bremse, Siemens and Petards will be key to our success. In addition, Zircon has experience in working with complex hardware and a number of COTS (Commercial Off-The-Shelf) products specifically designed for rail while our knowledge also covers supporting existing operational systems on the network. Zircon has been involved in Machine Learning (ML) research for over 5 years. In particular much of the research has utilised Video Analytics. After a successful 6 month trial, a previous research project called Platform Train Interface (PTI) Cam, was installed at London Underground Victoria station. PTI Cam detected passenger interaction and intrusion from platform to the track. PTI Cam forms the basis upon which the SEBS solution can be built. PTI Cam delivered a successful demonstration. Zircon are taking the same approach in this competition and applying it to the scenarios outlined, notably: trespass (short-cuts, fare evasion, graffiti) and theft. The system may inevitably detect potential suicide attempts which is not it's intended purpose, although could be seen as a secondary use case. TIDS is modular stand-alone off-grid CCTV safety system capable of being deployed in all environments and designed to deter trespassers on the railway network. The system is fully automated utilising statistical analysis and machine learning algorithms, parts of which, already proven in past projects. By deploying an automated powerful deterrent device such as TIDs, we will reduce the number of train delays as a result of trespass which will have a direct impact on improving customer satisfaction.

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| Archangel Imaging Ltd          | ADAPT - Autonomous Detection And Prevention of Trespass | £427,484               | £427,484               |

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## Project description - provided by applicants

The ADAPT (Autonomous Detection And Prevention of Trespass) autonomous trespass defeat system is produced by partners Archangel Imaging Ltd, Mandar Solutions Ltd and E-Bound AVX Ltd.

The ADAPT project will demonstrate how Artificial Intelligence (AI) based systems incorporating the latest sensor technology can make real benefits to railway platform safety and security. An autonomous system combining unintrusive ground and proximity sensors, coupled to verification from AI powered cameras, will demonstrate how cutting-edge technology can increase platform safety and reduce the incidence of trespass. The ADAPT standalone system is readily deployable to numerous locations, harvests power for its rechargeable batteries and provides alert messages to railway staff to allow human intervention. A deterrent system comprised of audible and visual warnings is incorporated into the system and is designed to deter and prevent incursions into areas that are either unsafe and/or off-limits to the general public. This technology has previously found use in systems designed to detect and protect wildlife in remote settings and to prevent theft from unattended buildings. Company descriptions follow:

Archangel Imaging specialises in advanced deployable machine vision systems, with power, communications and AI-enabled detection. Archangel Imaging is recognised for its expertise and focus on real, deployable capability for the end user. The company is an established supplier and partner of UK Ministry of Defence and several defence primes and specialist SMEs. The company is active in infrastructure security and safety monitoring (cable theft, rail safety, oil and gas leakage detection etc.) with various bespoke equipment being deployed in the Middle East, South East Asia and Northern Europe. The company maintains capability in deployable devices (cameras and others), communications (various redundant means), visual AI and management user interfaces for command and control.

Mandar Solutions works with organisations to deliver the right high quality wireless products and services between people, machines, and devices. Our customers are diverse but predominately active in Emergency Services, Exploration, Healthcare, Homeland Security, Transportation, and Utilities. The key personnel at Mandar Solutions have a long track record of delivering both standard and bespoke wireless products and services to industry and government. The company is building a reputation around creating innovative wireless solutions that deliver the highest levels of reliability and functionality. Mandar Solutions is developing and deploying a wide range of cost effective services across a range of bespoke and standard wireless technologies.

E-Bound AVX is engaged in technology development and creation of new products based on visual / IR related technology - intelligent detectors, battery and power management and camera technology. We specialise in roof alarm protection for churches and we have installed almost 1000 alarm systems across the country, some in severely challenging conditions and we have consistently demonstrated success.

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